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SILVICAL LEAFLET 8.

RED FIR.

Abies magnifica Murr.

Red fir is a tree of considerable silvicultural value on account of its ability to grow in fairly dense stands at high altitudes. At present it has little commercial value, and is not largely cut. The fact, however, that it often extends well up to timber line and readily restocks openings, makes it important in the forest cover of watersheds on the upper slopes.

RANGE AND OCCURRENCE.

Red fir, including its variety, Shasta fir, grows from the headwaters of the Willamette and Deschutes rivers in Oregon southward through the Cascades and Sierras to the divide between the White River and Kern River in Tulare County, Cal. It also grows in the coast ranges of southern Oregon and northern California.

Red fir is a tree of high elevations. In the coast ranges of northern California it extends between elevations of 4,500 and 6,000 feet; in the Cascades in Oregon, between 5,000 and 7,000 feet, and in the Sierras, between 6,000 and 10,000 feet. It usually occupies a sub-alpine position above the white fir type, and ascends well up to timber line. Occasionally, however, it extends down to the upper limit of the yellow pine and sugar pine belt.

CLIMATE.

The climate within the range of red fir is characterized by a comparatively short, vigorous growing season, and a long period of rest and of precipitation. The average annual precipitation is between

30 and 50 inches, a large part of which falls in the form of snow. Snow sometimes accumulates to a depth of over 20 feet, and covers the ground from November to June. The snowfall is usually much less, however, and melts before it is of great depth. The temperature seldom falls to zero in winter. During the summer the temperature is not excessive in the daytime, and the nights are usually humid and cool. At high elevations in the Sierras and Cascades, frosts often occur during the vegetative season.

HABIT.

The tree has a strong root system, a fairly clear trunk, and usually a pyramidal crown with rather short branches. The crown frequently becomes flat topped with age or in exposed situations. In high, exposed places the tree is small and is often scrubby, but in favorable situations, with good soil and abundant moisture, it often attains a diameter of from 8 to 10 feet and a height of 200 feet. In the Tahoe National Forest it reaches a maximum diameter of 6 feet and a height of 150 feet, with an average diameter of 31 inches and an average height of 122 feet.

Red fir is rarely wind thrown unless the trunk is defective. Its wood is light, soft, and weak, and has at present no great commercial value. It is used to some extent for cheap lumber and for packing cases.

The taper of the stem is rapid from an enlarged base, but trees usually average from three to five logs. The clear length is much greater than that of white fir. Red fir has a rather thick, ridgy bark, dark reddish-brown in color. Its bright cinnamon-red inner bark gives it its name. The foliage is persistent for 8 or 10 years.

ASSOCIATED SPECIES.

Below the timber line and above the white fir belt red fir forms dense pure, or nearly pure, stands of considerable extent. Throughout its range it associates at its upper limit with black hemlock, lodgepole pine, and western white pine. Black hemlock confines itself chiefly to draws, gulches, and ravines, and lodgepole pine to the borders of old lakes and moraines, while western white pine grows scattered through the more open stands of red fir. In northern California and southern Oregon red fir associates at low altitudes with yellow pine, sugar pine, and Douglas fir. In the Sierras it usually grows at its lower limit with white fir, which it displaces, often abruptly, at the upper altitudinal limit of white fir.

SOIL AND MOISTURE.

Red fir grows best on deep, moist soils. It prefers northerly and easterly exposures. On southerly exposures and in localities where moisture is deficient red fir confines itself chiefly to sheltered, cool, and moist situations, such as gulches, ravines, and the courses of streams. Under favorable conditions of moisture it will grow on shallow, rocky soils. In high, exposed situations, on poor soils, and wherever the moisture supply is deficient it becomes more or less stunted.

TOLERANCE.

Red fir is not especially shade enduring. It is less tolerant than white fir, incense cedar, and Douglas fir. It requires light throughout its life, and is in this respect similar to noble fir. Red fir avoids intermediate and subordinate positions. It usually forms groups and stands of equal age and of about equal height, which afford uniform overhead light for all the trees. Shade from the side is tolerated to some degree, but on the shaded side the branches die readily and clear themselves from the stems. The tolerance of red fir varies with soil, moisture, and climatic conditions; it is greater when these conditions are favorable than when they are poorly suited to the requirements of the tree.

REPRODUCTION.

With favorable conditions of moisture red fir reproduces itself freely. Some seeds are borne every year, but seasons of especially abundant production are at two or three year intervals.

The cones are borne at the tops of the crowns, chiefly by well-developed individuals growing in full sunlight. The seeds develop, mature, and are scattered in one season. They are light and winged and are well disseminated by the wind. Owing to the frozen condition of the soil, germination rarely takes place in the fall of the year in which the seeds fall. With an abundance of moisture the seedlings thrive in the open on both mineral and humus soils. Red fir reproduction is most abundant in protected localities with plentiful sunlight, and is likely to be sparse on exposed slopes where the growing season is short. The tree is often a valuable agent in reforesting denuded areas at high elevations within its range.

[Leaf. 8]

